Variations in Learning, Motivation, and Perceived Immediacy between Live and Distance Education Classrooms

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One-hundred and twenty lower division and 49 upper division undergraduate students enrolled in a small Midwestern university were randomly assigned to three experimental educational settings: a live classroom, a video classroom, and an audio with Powerpoint display classroom. The lower division students viewed a brief lecture presented in the live classroom and simulcast to the other two settings. The upper division students viewed a 45 minute lecture presented in the live classroom and simulcast to the other two settings. The impact of the settings on participant learning, motivation, and perceived teacher immediacy was assessed in both studies. Perceived instructor immediacy was significantly higher for the live setting. For the longer lecture, motivation, perceived learning, affect toward the instructor, and willingness to enroll with instructor all varied significantly and were highest in the live setting. Actual short-term learning varied significantly and was highest for the Powerpoint classroom. Student cognitive style was assessed, but the researchers found no significant variation based on this variable. **Keywords:** distance education, immediacy, motivation, perceived and actual learning, affective and behavioral learning, technology, Gregorc cognitive style, and PowerPoint

The diffusion of an innovation called "Distance Education" is apparent throughout higher education in the United States. In this study, we investigated classroom communication variables which can affect student learning in traditional classrooms (e.g., motivation, cognitive style, gender, and teacher immediacy behaviors) to enable further understanding of how such variables may affect learning in distance-education classrooms.

In 1988, the International Technology Education Association promoted "technology education" as the new basic. Such pedagogical changes were also forecast by Gill and Myers in 1989, as they described a then "state of the art" Florida campus on which faculty were being encouraged to deliver part or all of their courses via technology. While problems of access to higher education were cited as rationale for the distance education initiatives, benefits of cost-effectiveness were cited even more frequently (e.g., Albright & Post, 1993; Jones, 1992). In a 1997 volume of *New Directions for Teaching and Learning,* contributors suggested "The future for most institutions will be determined by the extent to which they have an educational product or products that are provided conveniently for the consumer at a competitive cost" (Connick, p. 9) and "potential students will shop for institutions that

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provide the most efficient and most student-centered services, whenever the student needs them . . . at the lowest cost" (Egan & Gibb, p. 39).

Imel (1996) describes four possible change responses to technology on college campuses: *minimal change* in which educators teach the same way as usual using technology as an instructional aid; *marginal change* in which educators teach the same way as usual but allow other students to participate in the traditional class format via distance technology; *systematic change* in which instruction is reorganized based on the technology being utilized; and *virtual system change* in which the current university structure disappears. Imel notes that minimal and marginal changes (as she has labeled them) are typical; if systematic or virtual changes are to occur, staff development to assist faculty with changing their teaching methodologies to suit the technologies will be necessary. Such a statement implies that teaching and learning via technology will be different processes than teaching and learning in traditional classrooms.

While such "minimal" and "marginal" changes are routinely being embraced by institutions of higher learning, challenges have been detected with both "minimal change" (e.g., Powerpoint presentations) and "marginal change" (e.g., distance delivery of on-campus classes). Howles (1997) reported that his extensive work developing and researching Powerpoint presentations at University of Wisconsin, Madison, has (thus far) demonstrated disappointing results related to learning. Not only has there been no significant increase in learning, some students complain that the classroom is too dark for them to see the professor's face, classroom interaction is decreased, and such presentations often seem "canned." UW-Madison students did report that they liked the Powerpoint Presentations when faculty made copies of the "slides" available, since classroom attendance then was not necessary (Howles, 1997). Haynes and Dillion (1992) found no increase in learning for distance-education in control and experimental sections while Cyrs (1997) cited challenges for "teleinstructors" as including "operating under a severe reduction in feedback cues from the learners about pacing and understanding" (p. 16) as well as "managing questions" and "involving students" (pp. 16 & 17). Yeaman (1994) argues that in spite of cost-effectiveness or other perceived benefits " . . . teachers are right to resist the problems resulting from the computerizing of society. People are being educated to fit the needs of the computer, and computers are producing uniformity in education and society" (ERIC abstract, p. 1).

In contrast to those who raise such challenges, Simonson (1997) claims that "the research clearly shows that distance education is an effective method of teaching and learning" (p. 88). Lemke even asserts that the use of classroom technologies can increase the quality of teacher communication (1992). While Lemke offers no research support for his contention, questions regarding the impact of technology on classroom communication and learning are timely and important.

Communication educators have been studying the "quality of teacher communication" for many decades. Almost all of that research has taken place in "traditional" (non-technology driven) classrooms. The authors are among the many communication educators who have studied what makes interaction among students and teachers more or less effective. Basic findings related to teacher communication are varied but have led to a consistent picture of excellence. Students at secondary and collegiate levels rate clarity, rapport, and effective delivery as communication behaviors of effective teachers (Cooper, 1995). McLaughlin and Ericson (1981)

found students associating the concept "ideal instructor" with one who participates, gives approval, accepts differences, and demonstrates sincerity and understanding. Carrell (1995) found that a match between student and teacher cognitive style was related to perceptions of teacher communication excellence. Norton's (1983) communicator style research linked effective teaching with "dramatic" behaviors, such as communication which is energetic, attention getting, and humorous. The most consistent finding related to excellent teacher communication is a set of communicative behaviors, which has been termed "immediacy" (Andersen & Andersen, 1982).

Teacher immediacy can be verbal and nonverbal. Nonverbal immediacy behaviors are nonlinguistic actions, which are approach behaviors, signals of availability for communication, typically multichanneled, and communications of interpersonal closeness and warmth (Andersen & Andersen, 1982). Verbal immediacy includes the teacher's use of spontaneous humor, verbal praise of students' classroom comments, following up on student initiated topics in classroom discussion, and demonstrations of willingness to have conversations with students outside the classroom (Gorham, 1988). With nonverbal and verbal immediacy as variables, some studies have demonstrated the link between teacher immediacy and student learning (Christophel, 1990; Christensen & Menzel, 1998; Gorham & Zakahi, 1990; Comstock, Rowell, & Bowers, 1995; Sanders & Wiseman, 1990). Christophel's (1990) landmark work examined the effects of teacher immediacy behaviors and student motivation on perceived cognitive and affective learning and found significant, positive relationships among these variables. These links with learning and student motivation are what make teacher immediacy, both verbal and nonverbal, such an important variable for investigation by communication educators in traditional and technology driven classrooms. Previous work has also suggested that gender (Guerrero & Miller, 1998) and cognitive style (Gregorc, 1985) variables which may affect learning, perceptions of teacher immediacy and motivation, though Menzel and Carrell (1999) found no such link.

McHenry and Bozik (1995), communication educators who have worked in the development and research of Iowa's state-wide distance education program, report that the program is successful, though they acknowledge that their success is defined as providing access to education for people who otherwise could not gain access. McHenry and Bozik caution that the impact of technology use on "classroom communication excellence" had not been studied; they issued a call for such work to be initiated by communication education researchers. These studies are a response to that call.

Research Questions

RQ1: Will state motivation vary based on lecture delivery type (live, Powerpoint, and video)?

RQ2: Will perceived teacher immediacy vary based on lecture delivery type (live, Powerpoint, and video)?

RQ3: Will a student's perceived learning vary based on lecture delivery type (live, Powerpoint, and video)?

RQ4: Will a student's actual learning vary based on lecture delivery type (live, Powerpoint, and video)?

RQ5: Will a student's learning (perceived and/or actual) vary based on the

interaction of lecture delivery type (live, Powerpoint, and video) and student cognitive style?

Method: Study One

In study one, we investigated our research questions with lower-level communication student participants concurrently receiving 15 minutes of communication instruction in three different classrooms: a "traditional" classroom in which the professor presented a "live" lecture; the "distance" model, represented by a simulcast video of the live lecture; and, in the third classroom, a Powerpoint presentation with a simulcast audio of the live lecture.

Participants

Participants for this study were 120 first year undergraduate students enrolled in communication courses in a small, liberal arts university in the Midwest (traditional students, ages 18–19). We did not consider student gender to be a variable, however, these participant groups were representative of the university population (55% female, 45% male).

Procedure

The researchers created a participant pool from all students in communication classes meeting at 8:00 AM and randomly assigned those participants into three treatment groups. Individual classroom instructors directed the participants to the research locations on the day of the study and informed them that: "Today you are all going to hear a brief lecture about how we process communication messages. You are also going to be able to participate in a study of different ways of sending communication messages." After this brief introduction, the participants walked to the research location where three contiguous rooms in a single hallway were used for the study. At the research location, the names of participants assigned to each of the three rooms were posted near the doorways. Research assistants were also assigned to each classroom to help the participants find the correct location.

The first treatment group of participants viewed a live lecture in an average-sized classroom built for 24. In the room with the students were a video camera and a camera operator placed as unobtrusively as possible in a corner of the room. The second treatment group simultaneously viewed a projected video image of the same lecture in a similar classroom. The researchers used a five-foot high, accurate-color, clear-image Synergy video projector along with a high fidelity sound system to ensure that the quality of both image and sound were high. As is common practice in video classrooms, the light was dimmed. The third treatment group simultaneously heard the same lecture and viewed a Microsoft Powerpoint slide program supporting the lecture in a classroom which was an exact replica of the classroom used for the live lecture. Again in this room, the researchers used a Synergy projector system in data mode with a high fidelity sound system. The classroom lights were on in this room. Research assistants remained in each of the classrooms.

After viewing/seeing/hearing the brief lecture, the research assistants read an oral consent statement to the participants and guided the participants in completing the battery of surveys used for the study. The research assistants assured the participants that they could withdraw at any time from the study. Participants completed the surveys in the presence of the research assistants and were be able to ask questions and seek clarifications. Two days following the treatment, classroom instructors

administered the recall test in their own classrooms. The researchers used the last four social security digits provided by each participant to match the recall data with the earlier surveys. This process was repeated twice, once in the fall semester with a male presenter, once in the spring semester of the same year with a female presenter.

Treatment

The researchers developed the treatment lecture around the theme of Gregorc cognitive styles and designed it to last 15 minutes. The lecture served as a convenient lead-in to the administration of the Gregorc Cognitive Style Indicator used for the study. The content of the lecture included high-immediacy references to the students and their lives and a similar high-immediacy application of concepts to the experiences of the students. The researchers presented the treatment lecture working from a memorized manuscript. In both administrations, the presenters sought to employ animated physical delivery, dramatic vocal style, and a high degree of eye contact. Wireless lavaliere microphones provided high-fidelity sound reproduction for the non-live rooms. For the first data collection, the male researcher presented the lecture. For the second data collection, with all procedures replicated, the female researcher presented the lecture.

Instruments

Gregorc Cognitive Style. The Gregorc Cognitive Style Indicator identifies the extent to which respondents tend to think in each of four possible cognitive style categories (Gregorc, 1985). Students rank 10 groups of four responses in terms of how the responses represent their typical patterns of thought. The Concrete Sequential individual orders thought toward direct applications and thinks in a linear manner, from start to finish. Next, the Concrete Random thinker is tied to direct applications but orders thinking in a variety of nonlinear ways. Third, the Abstract Sequential thinker thinks in terms of creative possibilities and organizes that thought from start to finish. Finally, the Abstract Random thinker considers creative possibilities in a variety of nonlinear ways.

Generalized Immediacy. We assessed teacher immediacy using Andersen's generalized Immediacy Scale (1979). This scale employs nine, seven-point semantic differential items to describe how the student feels about the immediacy behavior and style of the instructor. Five of the items contribute to the perception of teacher immediacy behaviors ("immediacy" score) while four of the items measure the extent to which students perceive the teaching style of the instructor as immediate (the "style" score). According to Kearney (1994), the GIS has proven very reliable in past studies with alphas between .84 and .97. Alpha for the "immediacy" items in this study was .96, while alpha for the "style" items was .83.

State Motivation. We assessed the students' state motivation with Christophel's (1990) State Motivation Scale. This scale assesses motivation for the class session through 12, seven-point, semantic differential items. Cronbach's alpha in Christensen and Menzel (1998) was .92. Alpha for the motivation scale in this study was .95.

Perceived Learning (Affective, Behavioral, and Cognitive). Three sets of four seven-point, semantic differential scales used by Christophel (1990) assessed perceived affective learning by asking students to report their feelings toward the content of the lecture (alpha of .88), the behaviors recommended by the lecture (alpha of .91), and the instructor (alpha of .94). Three sets of seven-point, semantic differential scales, also used by Christophel (1990), assessed behavioral intentions by asking students to

report the likelihood that they would engage in the behaviors suggested by the lecture (alpha of .93); enroll in another course in the same field of study (alpha of .96); and enroll in a course taught by the same instructor (alpha of .96). Perceived cognitive learning was measured with two, nine-point, semantic differential scales asking the students to rate how much they were learning during the lecture as well as how much they think they could learn if they had the ideal instructor.

Actual Learning. Actual learning was measured with a ten-item multiple choice quiz constructed by the researchers. Questions at various levels of Bloom's taxonomy (1956) were used, including recall, recognition, comparison, contrast, application, and prediction.

Analyses

The researchers used analysis of variance (ANOVA & MANOVA) to analyze the effect of presentation mode on motivation, immediacy, and various forms of learning as dependent variables. The three modes of presentation and the four Gregorc cognitive styles were independent variables, while all measures of learning were dependent variables. Alpha for all analyses was .05.

Results

RQ1: Will state motivation vary based on lecture delivery type (live, Powerpoint, and video)? The variation was not statistically significant [$F(2,111) = 0.40$; $p > .05$]. The estimated statistical power for this analysis was .15 for detecting a small relationship and .85 for detecting a moderate relationship (Cohen, 1998).

RQ2: Will perceived teacher immediacy vary based on lecture delivery type (live, Powerpoint, and video)? Perceptions of teacher immediacy varied significantly across the three treatments [$(F(2,111) = 5.62$; $p = .005$, $\omega^2 = .09$]. Immediacy was highest for the live lecture (Mean = 5.28; SD = 1.20), followed by the video setting (Mean = 4.56; SD = 1.57), and lowest for the Powerpoint setting (Mean = 4.17; SD = 1.92). Perceptions of the immediacy of the teacher's style of delivery also varied significantly across the three treatments [$F(2,111) = 7.74$; $p = .001$, $\omega^2 = .12$]. The perception of style was highest for the live lecture (Mean = 5.43; SD = 1.10), followed by the video setting (Mean = 5.00; SD = 1.29), and lowest for the Powerpoint setting (Mean = 4.31; SD = 1.43).

RQ3: Will a student's perceived learning vary based on lecture delivery type (live, Powerpoint, and video)? Perceived cognitive learning did not vary significantly across the three treatments [$F(2,11) = 0.96$; $p > .05$]. Affect toward the content being taught ($F(2,110) = 0.30$; $p > .05$], affect toward the behaviors being recommended [$F(2,110) = 0.19$; $p > .05$], affect toward the instructor [$F(2,110) = 2.00$ $p > .05$], willingness to engage in the recommended behaviors [$F(2,111) = 0.93$; $p > .05$], and willingness to enroll in a course with the same instructor [$F(2,111) = 0.39$; $p > .05$] were not statistically significant, though they were highest for the live setting. Willingness to enroll in a course with similar subject matter was highest for the Powerpoint setting [$F(2,111) = 1.20$; $p > .05$], though the variance was not statistically significant. The estimated statistical power for all of these analyses was .15 for detecting a small relationship and .85 for detecting a moderate relationship (Cohen, 1998).

RQ4: Will a student's actual learning vary based on lecture delivery type (live, Powerpoint, and video)? While recall was highest in the live setting, the variance was not statistically significant [$F(2,97) = 0.68$; $p > .05$]. The estimated statistical power for

this analysis was .15 for detecting a small relationship and .85 for detecting a moderate relationship (Cohen, 1998).

RQ5: Will a student's learning (perceived and/or actual) vary based on the interaction of lecture delivery type (live, Powerpoint, and video) and student cognitive style? There were no statistically significant main or interaction effects for medium of presentation by cognitive style. The lack of an even distribution of individuals across the four cognitive styles was a problem for this analysis. The Concrete Sequential style characterized 42 of the participants (33%), followed by the Abstract Random style (38/30%), the Concrete Random style (28/22%), and the Abstract Sequential style (4/3%). Fourteen participants reported strong preferences for more than one style (11%). The estimated statistical analysis was .15 for detecting a small relationship and .85 for detecting a moderate relationship (Cohen, 1998).

Discussion: Study One

As is noted in the literature review, a growing body of research has documented the positive impact of immediacy on learning, both perceived and actual. That perceptions of immediacy do vary significantly across the three types of presentation is worthy of note. As would be expected, the live setting scores highest in immediacy, with video and Powerpoint trailing. That immediacy is also higher for the video setting than it is for the Powerpoint setting indicates a preference for visual cues to an instructor's immediacy. Because of the importance that has been attached to student perceptions of immediacy in past studies, we see this point as having the potential to tip the effectiveness scales in favor of the live setting.

To further our investigation of the research questions, we extended our inquiry with a second study in which we altered our methodology with the goal of providing a treatment that was a more realistic representation of a typical lecture in both traditional and technology-driven classrooms. Instead of delivering a rather random topic to lower-level communication students, we used senior seminar students as participants and provided content that was topically appropriate for their level and was considerably more complex than the content provided in the lecture for Study One. In addition, we added a short-term recall measure, given immediately after the session, and increased the number of questions of the recall measures to 20 items. Since there was no significant interaction of instructor gender and medium of presentation in Study One [immediacy: $F(2,122) = 0.24$; $p > .25$ and style: $F(2,122) = 0.10$; $p > .25$] only one instructor presented content for Study Two.

Method: Study Two

Participants

Participants for this study were 49 undergraduate students enrolled in communication courses in a small liberal arts university in the Midwest. The participants were all senior communication majors enrolled in their senior seminar (55% female, 45% male). At this traditional university participants' ages ranged from 21–22.

Procedure

The procedure for Study Two was identical to that for Study One, with the exception of the actual treatment and the addition of a short-term recall quiz. The researchers developed the second treatment lecture around the theme of communication theory, quite appropriate for the senior seminar setting, and designed it to last 45 minutes.

As in Study One, the content of the lecture included high-immediacy references to the students and their lives and a similar high-immediacy application of concepts to the experiences of the students. The researcher presented the treatment lecture working from a memorized manuscript. As in Study One, the presenter sought to employ animated physical delivery, dramatic vocal style, and a high degree of eye contact.

Instruments

Basic Measures. All instruments, with the exception of the recall tests, were identical to Study One. Alpha for the basic measures used in Study Two were as follows: immediacy .98; style .84; and motivation .95. For affective learning, alpha reliability levels follow: feelings toward the content of the lecture .81; feelings toward the behaviors recommended by the lecture .88; feelings toward the instructor .89. Alpha levels for behavioral learning were as follows: likelihood that they would engage in the behaviors suggested by the lecture .95; likelihood that they would enroll in another course in the same field of study .96; likelihood that they would enroll in a course taught by the same instructor .97. These alpha levels are quite comparable to those found in Study One.

Actual Learning. Actual learning was measured with two, twenty-item multiple choice quizzes constructed by the researchers. Questions at various levels of Bloom's taxonomy (1956) were used, including recall, recognition, comparison, contrast, application, and prediction. All 40 items were randomly divided between the two tests. The first recall test was administered immediately after the lecture (short-term recall). The second recall test was administered two days later at the next class meeting (long-term recall).

Analyses

The researchers used analysis of variance (ANOVA & MANOVA) to analyze the effect of presentation mode on motivation, immediacy, and various forms of learning as dependent variables. The three modes of presentation and the four Gregorc cognitive styles were independent variables, while all measures of learning were dependent variables. Alpha for all analyses was .05.

Results

RQ1: Will state motivation vary based on lecture delivery type (live, Powerpoint, and video)? State motivation varied significantly across the three treatment levels [$F(2,36) = 7.57$, $p = .002$, $\omega^2 = .24$]. Motivation was highest in the live setting (Mean = 3.82, SD = 1.34), followed by the Powerpoint setting (Mean = 3.09, SD = 1.50), and the video setting (Mean = 1.92, SD = 0.80).

RQ2: Will perceived teacher immediacy vary based on lecture delivery type (live, Powerpoint, and video)? Though highest in the live setting, perceptions of teacher immediacy did not vary significantly across the three treatments [$F(2,36) = 1.85$; $p > .05$]. Though highest in the live setting, perceptions of the teacher's style of delivery also did not vary significantly across the three treatments [$F(2,36) = 2.23$; $p > .05$]. The estimated statistical power for this analysis was .08 for detecting a small relationship and .38 for detecting a moderate relationship.

RQ3: Will a student's perceived learning vary based on lecture delivery type (live, Powerpoint, and video)? Perceived cognitive learning varied significantly across the three treatments [$F(2,36) = 12.98$; $p < .001$, $\omega^2 = .35$]. Perceived cognitive learning

was highest in the live setting (Mean = 4.39, SD = 1.85), followed by the Powerpoint setting (Mean = 3.47, SD = 1.66), and the video setting (Mean = 1.47, SD = 1.41).

Affect toward the content being taught [$F(2,36) = 1.17$; $p > .05$] and affect toward the behaviors being recommended [$F(2,36) = 2.63$; $p > .05$] did not vary significantly, though they were both highest in the Powerpoint setting. The estimated statistical power for these analyses was .08 for detecting a small relationship and .38 for detecting a moderate relationship. Affect toward the instructor varied significantly across treatment levels [$F(2,36) = 9.77$ $p < .001$]. Instructor affect was highest in the live setting (Mean = 5.58, SD = 1.09), followed by the Powerpoint setting (Mean = 5.07, SD = 1.34), and the video setting (Mean = 3.55, SD = 1.29).

Willingness to engage in the recommended behaviors [$F(2,36) = 2.55$; $p > .05$] and willingness to enroll in a course with similar subject matter [$F(2,36) = 0.59$; $p > .05$] were highest for the Powerpoint setting, though none of the variance was statistically significant. The estimated statistical power for these analyses was .08 for detecting a small relationship and .38 for detecting a moderate relationship (Cohen, 1998). Willingness to enroll in a course with the same instructor varied significantly across treatment levels [$F(2,36) = 14.94$; $p < .001$, $\omega^2 = .45$]. Willingness to enroll with the same instructor was highest in the live setting (Mean = 5.09, SD = 1.81), followed by the Powerpoint setting (Mean = 4.69, SD = 1.60) and the video setting (Mean = 2.13, SD = 1.61).

RQ4: Will a student's actual learning vary based on lecture delivery type (live, Powerpoint, and video)? Short term recall varied significantly across the three treatment levels [$F(2,30) = 3.99$; $p < .05$, $\omega^2 = .21$]. Short term recall was highest in the Powerpoint setting (Mean = 13.35, SD = 2.55), followed by the live setting (Mean = 12.83, SD = 2.46) and the video setting (Mean = 10.93, SD = 2.84). While recall was highest in the Powerpoint setting for long term recall, the variance was not statistically significant [$F(2,30) = 1.76$; $p > .05$]. The estimated statistical power for this analysis was .08 for detecting a small relationship and .33 for detecting a moderate relationship (Cohen, 1998).

RQ5: Will a student's learning (perceived and/or actual) vary based on the interaction of lecture delivery type (live, Powerpoint, and video) and student cognitive style? There were no statistically significant main or interaction effects for medium of presentation by cognitive style. Again, the lack of an even distribution of individuals across the four cognitive styles prevented a complete analysis of this variable. The Concrete Sequential style characterized 18 of the participants (37%), followed by the Abstract Random style (12/24%), the Concrete Random style (12/24%), and the Abstract Sequential style (3/6%). The estimated statistical power for this analysis was .08 for detecting a small relationship and .38 for detecting a moderate relationship (Cohen, 1998). Four participants reported strong preferences for more than one style (8%). Given the small sample, the proportions are remarkably similar to those from Study One.

Discussion

So what does all of this mean for those interested in policy and practice of distance education? Unfortunately, this study raises more questions than it answers. For those ex-debaters among us who believe in the burden of proof, this investigation finds no proof that the new technologies offer anything to the educational process to warrant the time and expense that conversion to these technologies requires. In this sense,

there is no "value-added" to make the change worthwhile. On the other hand, for those who see the possibility of teaching more people with fewer dollars invested in teaching staff, this investigation finds that the *status quo* of face-to-face instruction is not statistically better than the new technologies. Thus would go the reasoning: we can save dollars through distance technology. Yet we are concerned enough about the lack of statistical significance to call for more research of these variables.

From another perspective, the questions raised by these findings are *not* "unfortunate" if they illuminate previously unconsidered variables that may interact with the potential effectiveness of communication in technology-driven classrooms. In future contrasts, we may need to ask, how do learning, motivation, and perceptions of immediacy differ between lower and upper division students, or between shorter and longer lecture formats? An intriguing variable uncovered in this study was the result of spontaneous student behavior: note-taking. The research assistants posted in each room reported that in Study Two, the only students who took notes were those in the Powerpoint classroom. In the absence of visual cues from a "live" instructor during a lengthy lecture, did the Powerpoint presentation medium cue students to take notes–resulting in increased recall scores? If so, would a live lecture with Powerpoint result in "more learning" (better recall) even if students were less motivated and/or perceived the teacher as less immediate than in the live setting? Other research has yet to confirm such an expectation (Howles, 1997) and certainly, relationships among learning, motivation, and immediacy have been demonstrated in traditional classrooms (e.g., Christophel, 1990). Does a Powerpoint presentation reduce the listening energy needed for processing new information by diluting content to "main points to remember"? Remember the students in Howles report who appreciated the professor making copies of the Powerpoint slides available so class attendance was not necessary (1997); if recall improves even though listening energy diminishes, has good teaching occurred?

The findings related to cognitive style are difficult to unpack given the lack of an even distribution among the styles. Perhaps communication majors tend toward a particular cognitive style, as Gregorc (1985) has suggested for other academic disciplines and professional categories. While cognitive style is the broader concept measuring overall thought patterns, perhaps the use of the more specific "learning style" measure would assist further investigations. Learning style describes the learner's preferred modality of receiving information, with categories such as "visual" or "auditory" (Cooper, 1995). Though a tendency for communication majors to have a particular learning style is possible, we may want to consider the use of a learning style measure rather than a cognitive style measure in future contrasts of live, Powerpoint, and video classrooms.

For the longer lecture, motivation, perceived learning, affect toward the instructor, and willingness to enroll with instructor all varied significantly and were highest in the live setting while in both studies the video-format typical of many distance education programs was not preferred by students and did not yield increases in learning. Imel's conception of virtual-system change is not yet justified. In the end, we feel comfortable that we will not be replaced by televisions and computer monitors just yet. And if we are replaced, the only reason so far tentatively justified is that distance technology has the potential to deliver more education to more people at a lower cost, with a statistically acceptable loss of quality. Though potentially

accurate, this is not a statement that those who care about education will greet with enthusiasm.

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